

## **IS THE EUROPEAN SCR EXPERIENCE ADEQUATE TO MEET THE CHALLENGES OF U.S. COALS?**

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The Selective Catalytic Reduction (SCR) technology started in Europe with the first German Plant, which began operation in 1985. There is over 50,000 MW of coal fired capacity currently in operation - mostly in Germany, Denmark, Sweden, Netherlands and Italy. The technology and the catalyst formulations emanated from Japan.

Until recently the total US units retrofitted with SCR were limited to less than 5,000 MW. There has been a recent sharp rise in the demand for SCR technology to address the EPA's SIP Call Rule. The DOE has estimated some 500 units of an average size of 345 MW to require SCR retrofits. The majority of these will be fired by coal.

A review of the European coal quality- both indigenous and imported variety -shows the use of lower sulfur, sodium and calcium than those of some of the US coals. A higher NO<sub>x</sub> removal efficiency than that in Europe could be required in the USA. The design of the majority of the boiler population in Europe was based on newer tower designs whereas the SCR retrofits in the US will need different process conditions, as dictated by the coal quality and the target NO<sub>x</sub> removal efficiency.

The US Coals range from 0.3 % sulfur for PRB and over 4% sulfur for Eastern bituminous coal. The consequent impact of the level of sulfur trioxide and arsenic from bituminous coal on catalyst poisoning and life expectancy is considered to be more severe than that experienced in Europe. The quantity and the nature of presence of calcium in PRB coal are unique in the US and have not been encountered in the European units. The European practice of controlling arsenic oxide level entering catalyst chamber by the addition of lime or limestone to coal could be of interest to US units firing similar coals.

A critical examination of the quality and quantity of PRB generated flyash with respect to their particle size and calcium and magnesium based compounds is recommended to assess their impact on the catalyst blockage and consequent life expectancy.

It is necessary to evaluate the impact of blends of Eastern bituminous and western in details to assess their impact on the performance of the retrofits and to predict their effect on the new units with respect to the catalyst selection and configuration as well as their life expectancy.

Non- vanadium and titanium based catalysts will be better suited to address the challenges of US coals. Chemical additives to modify the calcium based compounds of PRB flyash and to reduce LOI for flyash of bituminous coals will also benefit the US SCR Industry.